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Federal Climate Change Funding from FY2008 to FY2014

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Summary

Direct federal funding to address global climate change totaled approximately $77 billion from FY2008 through FY2013. The large majority—more than 75%—has funded technology development and deployment, primarily through the Department of Energy (DOE). More than one-third of the identified funding was included in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5). The President's request for FY2014 contains $11.6 billion for federal expenditures on programs. In the request, 23% would be for science, 68% for energy technology development and deployment, 8% for international assistance, and 1% for adapting to climate change. The Office of Management and Budget (OMB) also reports that energy tax provisions that may reduce greenhouse gas (GHG) emissions would reduce tax revenues by $9.8 billion.

At least 18 federal agencies administer climate change-related activities, according to OMB. Federal policy on climate change has been built largely from the "bottom up" from a variety of existing programs and mandates, presidential initiatives, and congressionally directed activities; funding has largely reflected departmental missions and support for each activity. Recently, the Obama Administration, in the context of its Climate Action Plan announced in June 2013, outlined an overall strategy with programs, resources, and tax incentives in a cross-agency, inter-governmental initiative. The new Climate Action Plan and a recent OMB report required by Congress on federal funding for climate change activities outline four main components of the strategy:

- Climate and Global Change Research and Education
- Reducing Emissions through Clean Energy Investments and Standards
- International Leadership
- Climate Change Adaptation

Possible Funding-Related Issues for Congress

Some Members of Congress have expressed interest in how federal funding may reflect and enable the Obama Administration's overall strategy, and priorities within it, to address climate change. Legislative issues regarding the federal funding of climate change activities may include the following:

- the sufficiency and alignment of federal resources to support a strategy to achieve long-term climate change policy goals;
- the demands of climate change adaptation programming for federal agencies, their programs, and resources;
- whether additional and predictable foreign aid resources may be provided to support actions by low-income countries to mitigate greenhouse gases or adapt to climate change;
- possible legislative proposals to restructure or improve collaboration among agencies regarding climate change activities;
- the incorporation of recommendations from evaluations (whether internal or external) to improve climate change programs; and

- possible requirements for reporting to Congress of funding, budget justifications, and programmatic progress that are adequate to support congressional decision-making and oversight.

Scope and Purpose of This Report

This report summarizes direct federal funding identified as climate change-related from FY2008 enacted funding through FY2013 and the FY2014 request (as well as a less consistent series beginning with FY2001). It reports the Administration's estimates of tax revenues not received due to energy tax provisions that may reduce GHG emissions. The report briefly identifies the programs and funding levels, as well as some qualifications and observations on reporting of federal funding. It further offers some issues that Members may wish to consider in deliberating on U.S. climate change strategies.

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Introduction

The federal government has funded work to address global climate change for more than four decades. An initial focus on science has expanded to encompass both mitigation and adaptation, involving at least 18 agencies plus the Executive Office of the President. The work supported is conducted by universities, national laboratories, private contractors, non-governmental organizations, and some federal agencies. Most of the funding has supported scientific and, since the 1990s, technological research and development (R&D).

Given uncertainties regarding the risks of future climate change, the federal climate strategy has aimed at improving the information available for decision-making and reducing the costs of technologies that could help abate the risks. A growing component has been federal planning and efforts to adapt to climate change. Complementing the science and technology initiatives have been regulatory actions;[1] programs to build capacity in private, state, local, and international entities to address climate change; and tax incentives to stimulate deployment of low greenhouse gas-emitting technologies. Many of these initiatives are identified in the Obama Administration's recently announced Climate Action Plan, which stated three main prongs:[2]

- cutting carbon pollution in America;
- preparing the United States for the impacts of climate change; and
- leading international efforts to address global climate change.

Federal funding for these activities described in this report differs across these priorities and has shifted over time. Policy instruments and programs depend on funding to differing degrees to be effective; some rely on large amounts of direct federal investment (e.g., in federal R&D) while others primarily require support for administrative expenses.[3]

As congressional and public debate continues with regard to whether and how to address climate change, the priorities for federal funding are likely to evolve further. Members of Congress have expressed a range of views about funding for climate change-related activities. Some question the relative priorities among initiatives or whether the risks of climate change merit the magnitude of federal expenditures and of federal policies on the economy in exchange for benefits that would mostly accrue to future generations, people in other countries, and stability of Earth systems. Other Members point to scientific and economic research to underpin their support for increasing funding to address climate change. Congressional debate on climate change funding takes place in the broader context of stark choices among competing fiscal demands.

[1] Regulatory actions have included some explicitly required by legislation, such as the Greenhouse Gas (GHG) Reporting Program under the Environmental Protection Agency (EPA). Others that have proceeded under the authority of the Clean Air Act and other existing laws include standards on tailpipe emissions of GHG from vehicles. For more information, see CRS Report R41212, *EPA Regulation of Greenhouse Gases: Congressional Responses and Options*, by James E. McCarthy.

[2] White House, "The President's Climate Action Plan," June 2013, http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf. For more discussion, see CRS Report R43120, *President Obama's Climate Action Plan*, coordinated by Jane A. Leggett.

[3] For example, a program that is the primary financier of a major new technology (e.g., carbon capture and sequestration) generally would require more funds to achieve its intended effects than a program that analyzes, promulgates, and enforces a regulation (depending on the scope and form of the regulation).

Federal Funding for Climate Change

The Office of Management and Budget (OMB) and federal agencies have identified approximately $77 billion of budget authority available to federal agencies from Fiscal Years 2008 through 2013 for climate change activities. The large majority—more than 75%—funded technology development and deployment, mostly through the Department of Energy (DOE). More than one-third of the identified funding during this period was appropriated in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5), enacted February 17, 2009.

This CRS report presents information available on federal budget authority in FY2008 through FY2013, and the President's FY2014 request, for climate change activities of federal departments and agencies. The amounts are reported by OMB, and occasionally by individual departments and agencies where noted. CRS relies on OMB and agency sources of data since most climate-related funding is appropriated at the subaccount level and therefore is not directly identifiable in legislation and committee reports. OMB has produced a "budget cross-cut" for climate change activities when it has been required by language in appropriations bills.[4] Individual agencies often report funding for specific programs, but that information may not be comprehensive or comparable to information on funding for climate change activities in other programs or agencies. Further, when agencies cooperate on programs, double-counting of funding could occur if one were simply to add up what the agencies each report.[5] Some of the OMB and agency sources may report inconsistent or incomplete data.[6] It is CRS's judgment that the amounts in the following tables likely underestimate total federal funding relating to climate change for the period, perhaps on the order of tens of millions of dollars (i.e., not billions). Information is not available for all programs for all years, as explained below.

Climate Change Initiatives

Tables in this report detail funding by agency in terms of budget authority.[7] Funding information is provided for several of the major federal initiatives which address climate change, including the following:

- the Global Change Research Program;

[4] OMB's most recent report (Office of Management and Budget. *Federal Climate Change Expenditures Report to Congress*. Washington, D.C: Executive Office of the President, August 2013) was released August 28, 2013 in response to Title IV, Division E, Section 425 of the Consolidated Appropriations Act of 2012 (P.L. 112-74), and continued under Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6).

[5] OMB's compilation largely eliminates issues with double-counting.

[6] For more detailed discussion of reporting challenges and examples, see archived CRS Report RL33817, *Climate Change: Federal Program Funding and Tax Incentives*, by Jane A. Leggett, as well as GAO. *Climate Change: Improvements Needed to Clarify National Priorities and Better Align Them with Federal Funding Decisions*. Washington DC, May 20, 2011. http://www.gao.gov/products/GAO-11-317.

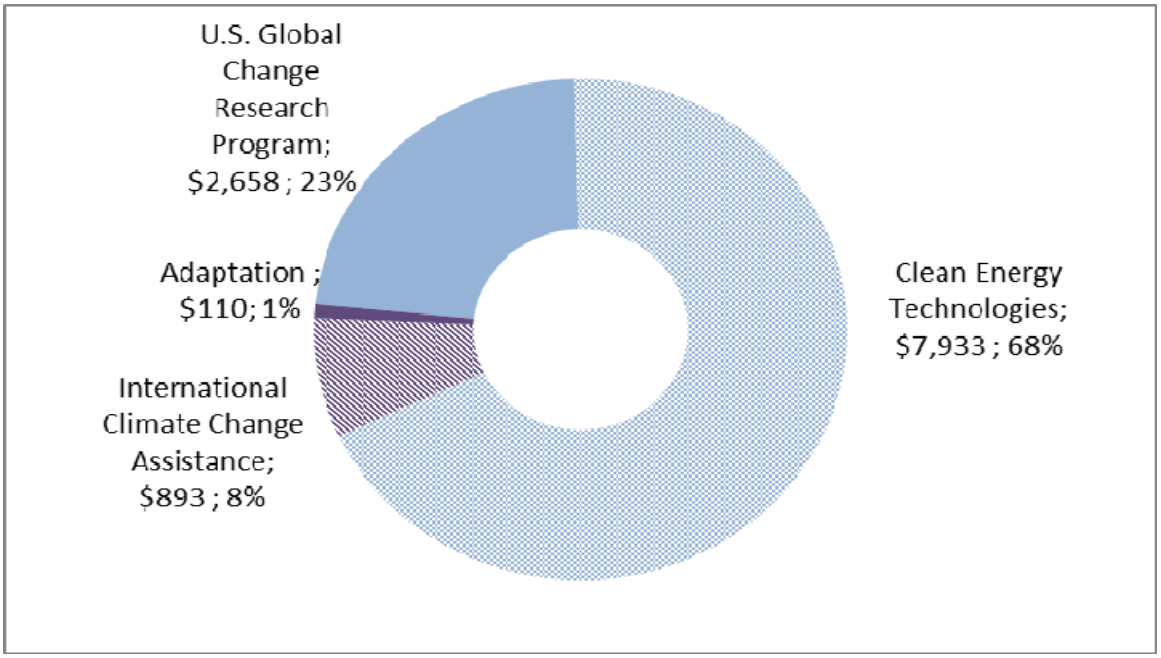
[7] According to OMB, in *Budget System and Concepts* (2008), "budget authority" is "the authority provided by law to incur financial obligations that will result in outlays," or spending. It should not be confused with actual expenditures of funds. See http://www.whitehouse.gov/omb/budget/fy2008/pdf/concepts.pdf. Budget authority identified in this memorandum for a given year is "new budget authority"—which this report uses interchangeably with "funding." New budget authority differs from total budgetary resources, or the total budget authority available for a specific purpose in a given year. (In some contexts, the term budget authority may be used to include new BA plus residual BA left unobligated, or unspent, from previous years.)

- Clean Energy Technologies, largely corresponding to the former Climate Change Technology Program;
- International Assistance, sometimes called the Global Climate Change Initiative; and
- Climate Adaptation, Preparedness, and Resilience.

The President's request for FY2014 contains $11.6 billion for federal expenditures on programs. In the request, 23% would be for science (the U.S. Global Change Research Program or USGCRP), 68% for "clean energy" technology development and deployment, 8% for international assistance, and 1% for adapting to climate change. The Office of Management and Budget (OMB) also reports energy tax provisions that may reduce greenhouse gas (GHG) emissions would reduce tax revenues by $9.8 billion.

Figure 1. The President's Request for Climate Change-Related Budget Authority for FY2014

(in millions of nominal 2013 dollars and percent of the request; excludes tax provisions)



Source: CRS graphic from data in Office of Management and Budget. *Federal Climate Change Expenditures Report to Congress*. Washington, D.C: Executive Office of the President, August 2013.

The Office of Management and Budget (OMB) also reports estimates of Energy Tax Provisions and Energy Grants in Lieu of Tax Provisions that may stimulate deployment of low GHG-emitting technologies. These fiscal incentives serve as exemptions to the baseline tax structure, and usually result in a reduction in the amount of tax owed. A review of these provisions is beyond the scope of this CRS report, though the OMB estimates are provided in **Table 4**.[8]

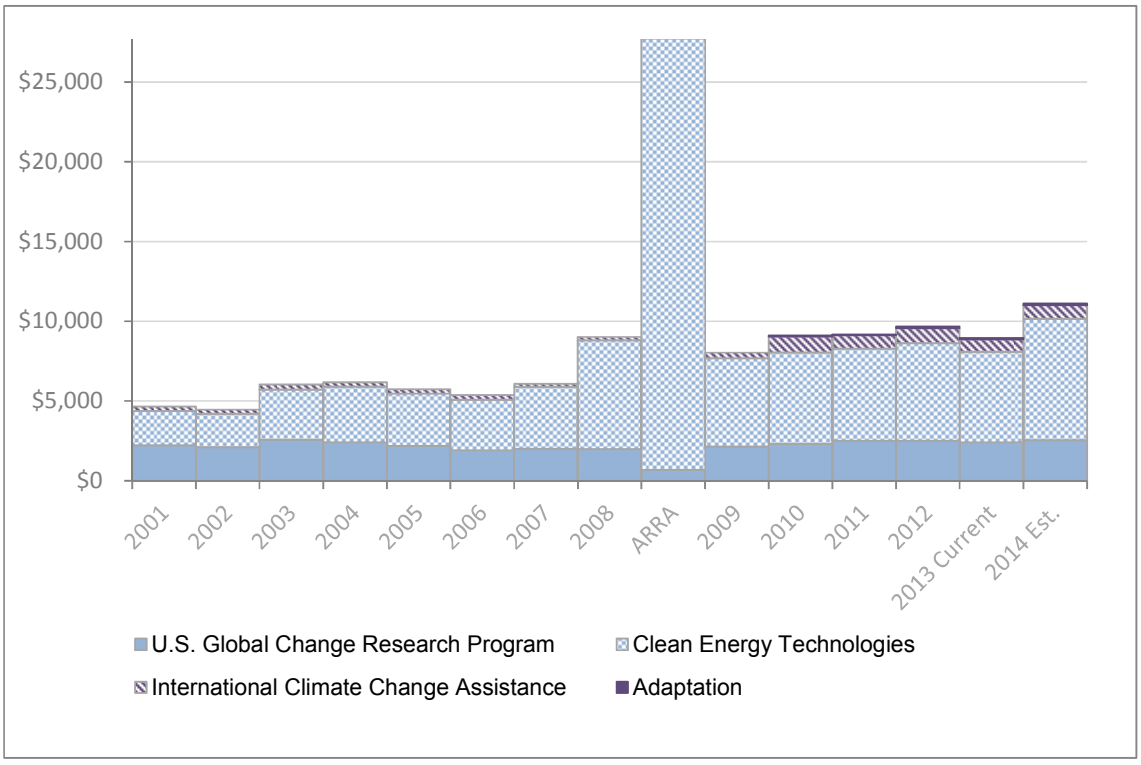
[8] For more information, see U.S. Office of Management and Budget, *Federal Climate Change Expenditures Report to Congress*, June 2010, at http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/FY2011_Climate_Change.pdf.

Minor inconsistencies sometimes exist in alternative reports on funding, perhaps due to rescissions or reprogramming, or because a program may be cast as climate change-related in some contexts but not in others. The reported initiatives are cross-agency "roll-ups" of programs and funding in the agencies, and information on some programs is available only to the degree that the agency has reported funding to OMB or Congress. Some activities, particularly those that consider or address potential impacts of climate change on federal programs or assets, likely existed prior to their being identified as climate change-related, so that funding may have occurred prior or in addition to activities listed in these tables. Other caveats about comparing or examining possible trends in funding are described in more detail in CRS Report RL33817, *Climate Change: Federal Program Funding and Tax Incentives*, by Jane A. Leggett.

This CRS report also provides a series of reported enacted budget authority and tax provisions for climate change programs since FY2001, in **Table 4**. One may presume that past numbers are increasingly inconsistent with present accounting the farther back in time, for reasons explained above. Nonetheless, the general magnitude of overall spending and the shifts in categories of spending may be useful to some. **Figure 2** shows those estimates of historical budget authority since FY2001 to the FY2014 request, adjusted for inflation (i.e., in constant 2012 dollars).

Figure 2. Federal Budget Authority for Climate Change Programs, FY2001 to the FY2014 Request, by Major Category of Program

(in millions of constant 2012 dollars)



Source: CRS figure using the White House Office of Management and Budget. *Federal Climate Change Expenditures Report to Congress*. Washington, D.C: Executive Office of the President, August 2013, as well as past OMB reports released in 2002, 2003, 2004, 2005, 2006, 2008, and 2010,

Notes: To inflate historical figures in 2012 dollars, CRS used OMB, *The Budget for Fiscal Year 2014, Historical Tables*, Table 10.1- Gross Domestic Product and Deflators Used in the Historical Tables: 1940-2018. CRS used the index for non-defense expenditures and adjusted the index so FY2012=1.0.

Names for groupings of programs aimed generally at the same goals have shifted through successive Administrations. The U.S. Global Change Research Program (USGCRP) was supplemented by the early 2000s with the Climate Change Science Program (CCSP), which is now folded into the USGCRP. Similarly, energy development and deployment programs, called the Climate Technologies Initiative in the late 1990s and the Climate Change Technologies Program (CCTP) through the 2000s, is largely consistent with the Clean Energy Technologies category reported most recently by OMB and illustrated in this figure. This time series presents the totals reported without attempting to adjust for minor changes in scope and emphasis across the initiatives.

Through most of the 1990s, most federal funding identified to address climate change was directed at improving the science, under the U.S. GCRP.[9] As **Figure 2** shows, by FY2001, investment in climate-related energy technology research, development, and deployment (Clean Energy Technologies) surpassed science (the U.S. GCRP) as the largest component of federal activities and has continued to increase its share since then; the share in FY2013 enacted budget authority shrunk slightly from FY2012, however. The one-time investment in climate-related technologies contained in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) was notably large and still constitutes more than one-fifth of all identified federal expenditures since FY2001 (including the FY2014 request). Adaptation to climate change has been added to the identified federal expenditures since FY2010, but remains too small to be seen as a share on the time series figure.

The Global Change Research Program (USGCRP)

The U.S. Global Change Research Program (USGCRP) was mandated by Congress in the Global Change Research Act of 1990 (P.L. 101-606). The USGCRP is intended to improve understanding of climate science, including the cumulative effects of human activities and natural processes on the environment; develop science-based resources to support policymaking and resource management; and communicate findings broadly among scientific and stakeholder communities. Thirteen departments and agencies participate in the USGCRP.[10] The White House Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB) work with the USGCRP to establish research priorities and funding plans to help ensure that the program is aligned with the Administration's priorities and reflects agency planning.

Table 1 below presents estimates for direct federal funding for the USGCRP from FY2008 through the FY2014 request. During the George W. Bush Administration, a second set of scientific research programs was identified and named the Climate Change Science Program. The CCSP is now merged into the USGCRP in the cross-cut budget.

[9] See GAO. Climate Change: Federal Reports on Climate Change Funding Should Be Clearer and More Complete. Washington DC, August 25, 2005. http://www.gao.gov/products/GAO-05-461.

[10] The Agency for International Development does not receive direct budget authority, but receives funding from other USGCRP agencies to cooperate in a few projects in low-income countries, for example, to support development of drought early warning systems. The Department of Defense also performs research related to global climate change, but those amounts are not included in the budget request for the USGCRP.

Table 1. Budget Authority for the Global Change Research Program (USGCRP)

(in millions of nominal dollars)

Agency	2008 Actual	ARRA Enacted	2009 Enacted	2010 Enacted	2011 Enacted	2012 Enacted	2013 Current[a]	2014 Request
Department of Agriculture	$63	$0	$0	$121	$116	$116	$106	$126
Department of Commerce	272	218	377	363	338	319	302	371
Department of Energy	128	65	168	171	183	211	209	220
Department of Health and Human Services	4	0	5	4	4	14	14	15
Department of the Interior	34	0	45	63	64	59	55	72
Department of State	0	0	0	14	3	3	3	3
U.S. Agency for International Development	0	0	0	28	25	11	11	14
Department of Transportation	1	0	2	3	1	1	1	1
Department of the Treasury	0	0	0	0	0	0	0	0
Environmental Protection Agency	17	0	18	21	20	18	17	20
National Aeronautics and Space Administration	1,084	237	1,086	1,123	1,431	1,427	1,435	1,499
National Science Foundation	207	121	269	320	321	333	316	326
Smithsonian Institution	6	0	6	7	7	8	8	8
Totals	**$1,816**	**$641**	**$2,023**	**$2,238**	**$2,513**	**$2,506**	**$2,463**	**$2,658**

Source: Office of Management and Budget. *Federal Climate Change Expenditures Report to Congress.* Washington, DC: Executive Office of the President, June 10, 2010, and August 28 2013; Office of Management and Budget. *Analytical Perspectives—Budget of the U.S. Government.* Washington DC: Executive Office of the President, 2010, 2011, 2012, and 2013. USGCRP website, http://www.globalchange.gov/about/budget-documents. For FY2012 and FY2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2014_R&Dbudget_climate.pdf.

Notes: N.A., or "not available," means that CRS could not identify appropriate figures.

Regular year funding for FY2009 and supplemental appropriations in the American Recovery and Reinvestment Act of 2009 (ARRA) (P.L. 111-5) are identified separately in this table.

a. FY2013 Current Budget Authority, according to OMB, as of June 21, 2013. It reflects funds available calculated as the amount appropriated (FY2013 Enacted Budget Authority, data not shown), minus reductions triggered by the Budget Control Act of 2011 (P.L. 112-25) sequestration order issued March 1, 2013

Clean Energy Technologies

The Clean Energy Technologies (CET) efforts are intended to research, develop, and deploy technologies that would reduce GHG emissions compared to technologies currently commonly used. Besides federal R&D, CET includes a variety of voluntary partnership and grant activities.

Funding provided by the CET initiative is intended to stimulate the development and use of selected energy technologies, including renewable, low-carbon fossil, and nuclear technologies as well as energy efficient technologies, products, and process improvements. Consequently, the large majority of CET budget authority has been in the Department of Energy.

The CET initiative is a recent iteration of the Climate Change Technology Program (CCTP) that was formally established administratively under President George W. Bush, which itself included a number of existing programs. The FY2014 budget request calls for an investment of nearly $7.9 billion in support of CET, a 30% and 37% increase in comparison to the enacted FY2012 and current FY2013 budget authority, respectively. These funds reflect the current Administration's priority for new technologies as a means to facilitate future GHG reductions and meet the President's GHG emissions reduction targets, in the range of 17% below 2005 levels by 2020 and approximately 83% below 2005 levels by 2050. Meeting the 2050 target would likely require radical change from the currently prevalent energy system.

The Department of Energy coordinated the CCTP inter-agency effort through a central office. It is unclear to what degree the current programs are coordinated as an inter-agency strategy, or through what mechanism. However, as is apparent in the budget figures below, most of the activities are within the Department of Energy.

Table 2 presents estimates, to the extent they are available, for direct federal funding for the CCTP from FY2008 through the FY2014 request.

Table 2. Budget Authority for Clean Energy Technologies (Largely the Former Climate Change Technology Program)

(in millions of nominal dollars)

Agency	2008 Actual	ARRA Enacted	2009 Enacted	2010 Enacted	2011 Enacted	2012 Enacted	2013 Current[a]	2014 Request
Department of Agriculture	$205	$271	$100	$453	N.A.	$275	$305	$265
Department of Commerce	8	4	15	18	N.A.	40	40	43
Department of Defense	150	139	261	226	N.A.	481	437	457
Department of Energy	5,745	25,223	4,543	4,399	5,503	4,388	4,144	6,212
Department of Transportation	19	100	43	125	N.A.	91	56	52
Environmental Protection Agency	107	0	111	133	113	117	111	115
National Aeronautics and Space Administration	139	31	119	124	N.A.	296	276	321
National Science Foundation	21	2	24	26	30	341	346	372
Nuclear Regulatory Commission	N.A.	N.A.	N.A.	N.A.	N.A.	83	57	86
Tennessee Valley Authority	N.A.	N.A.	N.A.	N.A.	N.A.	9	11	10
Totals	**$6,394**	**$25,770**	**$5,216**	**$5,504**	**$5,646**	**$6,121**	**$5,783**	**$7,933**

Source: Climate Change Technology Program, workbook of detailed funding data provided to CRS, 2008; Office of Management and Budget. *Federal Climate Change Expenditures Report to Congress*. Washington, DC: Executive Office of the President, June 10, 2010, and August 28, 2013; DOE CCTI estimates in FY2010-2012 enacted also from http://www.cfo.doe.gov/budget/12budget/Content/Volume2.pdf (p. 200); and (p. 135); NSF enacted for CCTP also from http://nsf.gov/about/budget/fy2012/pdf/fy2012_rollup.pdf, p. 12, and http://www.nsf.gov/about/budget/fy2013/pdf/02-Summary_Tables_fy2013.pdf.

Notes: N.A., or "not available," means that CRS could not identify appropriate figures.

Regular year funding for FY2009 and supplemental appropriations in the American Recovery and Reinvestment Act of 2009 (ARRA) (P.L. 111-5) are identified separately in this table.

a. FY2013 Current Budget Authority, according to OMB, as of June 21, 2013. It reflects funds available calculated as the amount appropriated (FY2013 Enacted Budget Authority, data not shown), minus reductions triggered by the Budget Control Act of 2011 (P.L. 112-25) sequestration order issued March 1, 2013.

International Assistance

The United States supports international financial assistance for global climate change initiatives in developing countries. Under the Obama Administration, this assistance has been articulated primarily as the Global Climate Change Initiative (GCCI), a platform within the President's 2010 Policy Directive on Global Development. The GCCI aims to integrate climate change considerations into U.S. foreign assistance through a range of bilateral, multilateral, and private sector mechanisms to promote sustainable and climate-resilient societies, foster low-carbon growth, and reduce emissions from deforestation and land degradation. The GCCI is implemented primarily through programs at three "core" agencies: the Department of State, the Department of the Treasury, and the U.S. Agency for International Development (USAID). Most GCCI activities at USAID are implemented through the agency's bilateral development assistance programs. Many of the GCCI activities at the Department of State and the Department of the Treasury are implemented through international organizations, including the United Nations Framework Convention on Climate Change's Least Developed Country Fund and Special Climate Change Fund, as well as multilateral financial institutions such as the Global Environment Facility, the Clean Technology Fund, and the Strategic Climate Fund.

Table 3 presents estimates for federal budget authority for the GCCI from FY2008 through the FY2014 request.[11]

[11] For more information, see CRS Report R41845, *The Global Climate Change Initiative (GCCI): Budget Authority and Request, FY2010-FY2014*, by Richard K. Lattanzio.

Table 3. Budget Authority for the International Climate Change Assistance (Also Referred to as the Global Climate Change Initiative, or GCCI)

(in millions of nominal dollars)

Agency	2008 Actual	ARRA Enacted	2009 Enacted	2010 Enacted	2011 Enacted	2012 Enacted	2013 Current[a]	2014 Request
Department of Agriculture	$0	$0	$4	$5	N.A.	$3	$3	$1
Department of Commerce	0	0	11	11	N.A.	N.A.	N.A.	N.A.
Department of Energy	0	0	0	13	N.A.	13	13	13
Department of State	41	0	55	202	125	133	126	133
US Agency for International Development	115	0	222	306	398	348	335	349
Department of the Treasury	46	0	46	438	296	377	296	356
Environmental Protection Agency	0	0	20	21	N.A.	18	16	19
Millennium Challenge Corporation	0	0	0	2	N.A.	41	0	0
National Aeronautics and Space Administration	0	0	2	2	N.A.	3	3	3
National Science Foundation	0	0	3	6	N.A.	6	6	3
US Trade and Development Agency	0	0	10	17	N.A.	16	0	18
Totals	**$202**	**$0**	**$373**	**$1,023**	**$819**	**$958**	**$797**	**$893**

Source: Office of Management and Budget. *Federal Climate Change Expenditures Report to Congress.* Washington, DC: Executive Office of the President, June 10, 2010, and August 28, 2013; CRS Report R41845, *The Global Climate Change Initiative (GCCI): Budget Authority and Request, FY2010-FY2014*, by Richard K. Lattanzio.

Notes: N.A., or "not available," means that CRS could not identify appropriate figures.

Regular year funding for FY2009 and supplemental appropriations in the American Recovery and Reinvestment Act of 2009 (ARRA) (P.L. 111-5) are identified separately in this table.

OMB began to provide a budget cross-cut for the GCCI for FY2011, identifying specific funding amounts for the principal international agencies involved and noting that other agencies contribute. OMB did not identify specific enacted budget authorities for those other agencies, and doing so would likely double-count at least some of the funds represented in other tables. Where CRS understands that no funds were available, a zero is used; in those cases where some funds may be used in conjunction with the GCCI, CRS uses N.A. in this table.

a. FY2013 Current Budget Authority, according to OMB, as of June 21, 2013. It reflects funds available calculated as the amount appropriated (FY2013 Enacted Budget Authority, data not shown), minus reductions triggered by the Budget Control Act of 2011 (P.L. 112-25) sequestration order issued March 1, 2013.

Climate Adaptation, Preparedness, and Resilience

Funding does not appear to be reported by most agencies in support of their plans to adapt to climate change, or "Adaptation Plans," as stipulated under Executive Order 13514 and reported since 2012 in agencies' Strategic Sustainability Performance Plans (SSPPs). Many agencies are in early stages of planning or implementation, and the related funding would in almost all cases be in the details of appropriations accounts, and therefore not readily available.

One exception is the Department of the Interior (DOI). The Secretary of Interior issued Secretarial Order 3289 in 2009 (amended in 2010), "addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources." DOI has identified vulnerabilities to its missions and assets, as well as to tribes and their resources, and has developed plans and associated budgets to address those vulnerabilities. According to OMB, enacted budget authority for this purpose increased from $88 million in FY2012 to $90 million in FY2013 (after sequestration). The request for FY2014 was $110 million. These amounts do not include resources in the U.S. Geological Survey, as their efforts to provide related science to support the bureaus and other agencies are reported in the USGCRP.

Principal Observations and Legislative Issues

Over the past two decades, federal funding for climate change-related activities has expanded from scientific research, almost exclusively, to a wide variety of programs to (1) develop and disseminate technologies; (2) build an informational and analytical foundation for future policy actions; (3) plan for adaptation to actual or expected climate change; (4) assist private sector decision-makers and lower-income countries; and (5) address additional needs. Federal strategy on climate change largely reflects the aggregation of a variety of existing programs, presidential initiatives, and congressionally directed activities. Presidential initiatives have been built largely from existing programs, and agencies have contributed to shared program goals using existing resources and expertise. Priorities tend to be based on departmental missions and the degree of support for the input activities. As the debate continues over appropriate strategies to address climate change, the needs and priorities for funding are likely to evolve further.

Federal budget for climate change-related programs is primarily aimed at investment and tax provisions aimed at stimulating energy technologies that may reduce GHG emissions. The Clean Energy Technologies category represents 68% of the President's request for FY2014. Over the period since FY2001, including the FY2014 request, these technology programs constitute more than 70% of all funding for identified climate change-related programs (excluding tax provisions). By itself, the one-time injection of resources in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5)—almost entirely for energy technology development—is nearly one-quarter the cumulative spending from FY2001 through FY2013.

Since FY2001, funding for climate change science has remained roughly constant, varying up or down by as much as 15% in real dollars (i.e., adjusted for inflation). Funding for science was near its real-dollar low in FY2008, and would almost reach a high if the FY2014 request were enacted. (The peak was $2,577 million in FY2003 in 2012 constant dollars.)

International assistance, to facilitate capacity-building and efforts by selected, low-income countries to mitigate their GHG emissions and adapt to expected climate change, has nearly

tripled from FY2001 to the current FY2013 budget authority. The FY2014 request proposed an increase of the current FY2013 amount by 9.5%, to $856 million. This is 8% of the President's request.

Adaptation to climate change has grown in attention across the federal agencies, as well as across segments of the public and private sector. Although activities in the federal agencies have expanded, especially since 2009, little of this activity is reported in OMB's budget cross-cut. This omission probably reflects the relatively low level of effort in most agencies, and that efforts are typically add-ins to wider programs rather than stand-alone activities. For example, grants for coastal zone planning may incorporate effects of potential sea level rise and storm surges as one consideration among many in those plans. Only the Department of the Interior, which has a department-wide effort to identify and address vulnerabilities to the assets it manages, explicitly reports adaptation funds. This is less than 1% of the FY2013 funding across agencies.

Interpreting how funding relates to levels of effort to address climate change is challenged by several reporting issues. Identifying actual funding for climate change activities is clouded by several ongoing issues, including the following:

- the levels of aggregation of the budget request;
- changes in scope of what is reported;
- changes in accounting methods used over time;
- inconsistencies across agencies in defining and interpreting methods for reporting activities;
- lack of description by agencies for subaccount level climate change-related activities in their budget documentation; and
- omissions of reporting of some arguably climate-related activities in the overall program.

In light of these issues, the Government Accountability Office (GAO) investigated the Administration's reporting practices in 2005, 2006, and 2011.[12] GAO recommended that the Administration provide greater clarity and consistency of reporting on federal funding for climate change activities. While some improvements were made following the 2006 GAO report, many issues persist, confounding analysis of climate change funding. The 2011 GAO report concluded that there were two key factors that "complicate efforts to align funding with priorities": (1) "... federal officials do not have a shared understanding of strategic priorities" and (2) "... since mechanisms for aligning funding with priorities are nonbinding, they are limited when in conflict with agencies' own priorities."[13] In addition, congressional priorities may differ from the President's goals and requests, further complicating alignment of goals and priorities.

[12] GAO, *Improvements Needed to Clarify National Priorities and Better Align Them with Federal Funding Decisions* GAO-11-317, May 20, 2011; GAO, *Climate Change: Greater Clarity and Consistency Are Needed in Reporting Federal Climate Change Funding*, GAO-06-1122T, Washington DC, September 21, 2006; GAO. *Climate Change: Federal Reports on Climate Change Funding Should Be Clearer and More Complete*. Washington DC, August 25, 2005.

[13] GAO. *Climate Change: Improvements Needed to Clarify National Priorities and Better Align Them with Federal Funding Decisions*. Washington DC, May 20, 2011. http://www.gao.gov/products/GAO-11-317. Highlights.

The funding data described in this report derive primarily from OMB's series of *Reports to Congress on Federal Climate Change Expenditures* published through the requirements in various appropriation laws passed from 2002 through 2008, 2010, and 2012. In response to language included in FY2012 appropriations, OMB released its latest report on August 28, 2013. It appears that OMB produces these budget cross-cuts only when required by legislation. If the 113th Congress finds data on climate change funding and programs useful for oversight and other legislative purposes, it may consider renewing requirements for reporting of climate change-related activities, including directions that would continue to improve clarity and consistency compared to previous reports.

Viewing Efforts Across Federal Agencies and Programs Through a Cross-Cut Budget

Compilation and strategic management of resource allocation and use across agencies for a particular policy, called a "cross-cut budget," is occasionally used in federal budgeting and appropriations.[14] On the one hand, cross-cut budgeting may be a useful exercise where a policy area or one or more policy goals engage a variety of departments and agencies. With a cross-cut budget, Congress, agencies, and non-federal stakeholders may seek to better understand and align resources and implementation across agencies and appropriations subcommittees. On the other hand, the development of cross-cut budgets also may add workload for related agencies and the Office of Management and Budget. For reasons stated in this report by GAO, and others, budget cross-cuts and long time-series may contain inconsistencies—due to changing terminology, concepts, and priorities—that track ongoing developments but also may limit the reliability and utility of underlying data, to some extent.

Some Members of Congress have expressed interest in how federal funding may reflect and enable the Obama Administration's overall strategy, and priorities within it, to address climate change. Beyond the amounts of budget authority in this report, further legislative considerations regarding the federal funding of climate change activities may include the following:

- the sufficiency and alignment of federal resources to support a strategy to achieve long-term climate change policy goals;
- the demands of climate change adaptation programming for federal agencies, their programs, and resources;
- whether additional and predictable foreign aid resources may be provided to support actions by low-income countries to mitigate greenhouse gases or adapt to climate change;
- possible legislative proposals to restructure or improve collaboration among agencies regarding climate change activities; and
- the incorporation of recommendations from evaluations (whether internal or external) to improve climate change programs.

[14] For another federal cross-cut budget, see discussion in CRS Report RL34329, *Crosscut Budgets in Ecosystem Restoration Initiatives: Examples and Issues for Congress*, by Pervaze A. Sheikh and Clinton T. Brass.

Table 4. Federal Climate Change Programs: FY2001-FY2013 Enacted, and the President's FY2014 Request

(in millions of nominal dollars, except where noted)

Major Climate Change Program Areas	Budget Authority (Fiscal Years, Enacted Except FY2013 and FY2014)														
	2001	2002	2003	2004	2005	2006	2007	2008	ARRA	2009	2010	2011	2012	2013 Current[a]	2014 Request
U.S. Global Change Research Program (including the former Climate Change Science Program)	$1,728	$1,667	$2,078	$1,996	$1,864	$1,691	$1,825	$1,864	$641	$2,023	$2,195	$2,448	$2,506	$2,463	$2,658
Clean Energy Technologies (formerly Climate Change Technology Program)	$1,675	$1,637	$2,533	$2,870	$2,808	$2,789	$3,485	$6,394	$25,499	$5,216	$5,504	$5,646	$6,121	$5,783	$7,933
International Climate Change Assistance	$218	$224	$270	$252	$234	$249	$188	$202	$0	$323	$939	$819	$958	$797	$893
Adaptation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$69	$35[a]	$88	$90	$110
All Areas	**$3,621**	**$3,528**	**$4,881**	**$5,118**	**$4,906**	**$4,729**	**$5,498**	**$8,460**	**$26,140**	**$7,562**	**$8,707**	**$8,948**	**$9,673**	**$9,133**	**$11,594**
All Areas in Constant 2012 Dollars	*$4,650*	*$4,471*	*$6,053*	*$6,189*	*$5,745*	*$5,361*	*$6,076*	*$9,027*	*$27,739*	*$8,025*	*$9,112*	*$9,166*	*$9,673*	*$8,955*	*$11,112*

Major Climate Change Program Areas	Budget Authority (Fiscal Years, Enacted Except FY2013 and FY2014)														
	2001	2002	2003	2004	2005	2006	2007	2008	ARRA	2009	2010	2011	2012	2013 Current[a]	2014 Request
	Estimated Revenue Loss Effects of Energy Tax Provisions														
Energy Tax Provisions That May Reduce Greenhouse Gases	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**ARRA**	**2009**	**2010**	**2011**	**2012**	**2013 Est.**	**2014 Est.**
	$0	$0	$580	$500	$369	$1,160	$1,520	$1,520	$0	$1,440	$4,140	N.A.	$10,132	$13,079	$9,839
Tax Expenditures in Constant 2012 dollars	*$0*	*$0*	*$719*	*$605*	*$432*	*$1,315*	*$1,680*	*$1,622*	*$0*	*$1,528*	*$4,332*	*$0*	*$10,132*	*$12,824*	*$9,430*
Total Budgetary Impact[b]	**$3,621**	**$3,522**	**$5,461**	**$5,618**	**$5,275**	**$5,889**	**$7,018**	**$9,980**	**$26,140**	**$9,002**	**$12,277**	**N.A.**	**$19,805**	**$22,212**	**$21,433**
Total Budgetary Impact in Constant 2007 Dollars	*$4,650*	*$4,471*	*$6,773*	*$6,793*	*$6,178*	*$6,676*	*$7,756*	*$10,648*	*$27,739*	*$9,553*	*$13,444*	*$9,166*	*$19,805*	*$21,779*	*$20,542*

Source: Prepared by CRS based on data reported by OMB, including in *Federal Climate Change Expenditures Report to Congress FY2014*, August 2013; *Federal Climate Change Expenditures Report to Congress, FY2008*, May 2007, Table 8, p. 27; *Federal Climate Change Expenditures Report to Congress, August 2003*, Table 1; and *Federal Climate Change Expenditures Report to Congress, July 2002*, Table 1.

Notes: OMB adjusted the science and technology amounts for FY2003, FY2004, and FY2005 to reflect more recent accounting within these program areas. Remaining inconsistencies are likely across years due to changes in the scopes of what is considered for "climate change" and methods of allocating certain costs to programs.

To convert from nominal to 2012 dollars, CRS used OMB, *The Budget for Fiscal Year 2014, Historical Tables*, Table 10.1- Gross Domestic Product and Deflators Used in the Historical Tables: 1940-2018. CRS used deflators for non-defense expenditures and adjusted index so FY2012=1.0.

The total impact to the federal budget in each year as reported by OMB may differ somewhat from the sum of budget authority for each program area and the estimates of tax expenditures, due to exclusion by OMB of dollar amounts for certain activities to avoid double-counting.

a. FY2013 Current Budget Authority, according to OMB, as of June 21, 2013. It reflects funds available calculated as the amount appropriated (FY2013 Enacted Budget Authority, data not shown), minus reductions triggered by the Budget Control Act of 2011 (P.L. 112-25) sequestration order issued March 1, 2013.

b. Because the estimate for the adaptation efforts in this year is incomplete, this figure is likely an underestimate of the actual amount.

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